



Impact Analysis and Decision Strategies

This project examined the public and private values of agricultural research and how agricultural research is evaluated and funded, helping to make sure that the costs and benefits of discoveries and technologies are distributed appropriately.

Who cares and why?

Continued improvement in American social well-being, international competitiveness of American agriculture, and resolution of production and environmental problems facing American farmers depends on public and private investments in research and development (R&D). R&D generate technologies and provide information that enhance agricultural productivity, environmental quality, and food product quality and safety, and maintain the economic vitality of rural communities. R&D also help evaluate and improve the performance of public policies. Because R&D face funding challenges and time delays, falling behind is easy. Traditionally, Land-Grant Universities (LGUs) have argued successfully that their research budgets should be financed from public tax dollars because

their research contributes public-good discoveries. Recently, federal legislation has changed the way R&D projects secure funding. It has become more common for public universities to receive support from private firms and individuals in the form of contracts, gifts, and endowments. In particular, the Bayh-Dole Act of 1980 has provided the opportunity for public universities to undertake research and profit from licensing, selling discoveries, or from supporting start-up companies. Much remains unknown about the long-term impacts of R&D for profit in public universities and there is special concern about the balance of the public and private value of this research and exclusive rights to discoveries or inventions. In recent decades, competitive grants programs have also become a common funding strategy; however, these grants have often—intentionally and unintentionally—given funding advantages to new research areas, larger, higher-profile LGUs, and certain states. Furthermore, these grants have not sufficiently covered research costs. Resolving the debate about the future direction of funding for agricultural R&D and continuing the flow of scientific discoveries is critical to enhancing agricultural productivity and sustainability, environmental quality, and social welfare. To do this, a closer look at the decision making strategies for and impacts of agricultural research is needed.



Part of NC-1034's goal is to determine the distribution of the costs and benefits of agricultural research. In one study, researchers determined that, of the \$240 million net world benefit from the first-year adoption of Bt cotton in the U.S., U.S. farmers received 59% of the surplus, technology developers received 26%, and U.S. consumers received 9%. Photo courtesy of USDA-ARS.

What has the project done so far?

This project has brought together 35 scientists from 25 institutions to develop information for making and implementing agricultural science policy in public and private sectors. Project members have estimated the flow and distribution of benefits and costs of agricultural research. Furthermore, the team has analyzed decision making strategies used by public institutions and private organizations for funding, planning, managing, and evaluating agricultural research. The team has also analyzed opportunities,

risks, and net benefits of public-private linkages. By emphasizing collaboration, NC-1034 scientists have reduced research duplication and maximized their ability to compare results. Project members have published reports and given research briefings that have been used by policymakers and have also contributed to textbooks and handbooks for scientists and students. Many of these publications have received awards and the group's research has been widely cited.

Impact Statements

Increased knowledge about agricultural research issues and impacts among institutions and government officials, leading to more informed policy and funding decisions. In particular, NC-1034 research showed that federal competitive grant programs are less effective in raising agricultural productivity than federal formula and state government funding.

Developed new methods for assessing risks and benefits of agricultural biotechnologies. For example, the EPA used research about insect resistant crops to design regulations and the USDA used genetically modified food research to revise approval policies.

Developed methods for evaluating economic impacts of agricultural research that have been used by Federal Scientific Advisory Panels, the World Bank, USDA, and Economic Research Service.

Evaluated the distribution of costs and benefits of agricultural research. One study found that for every \$1 invested in Agricultural Research Divisions in the 48 continental states, the rate of return averaged 29% (higher than S&P 500 and NASDAQ average returns during the same time period). Another study found that when U.S. farmers use new wheat and rice varieties that were created as aid for developing countries, the value of benefits to U.S. consumers exceeds total USAID contribution value.

What research is needed?

To effectively plan and implement an agenda for public research in agriculture, more substantive information and analyses are needed on the distribution of environmental and other selected externalities among producers, consumers, and industry; key relationships between research investments and other public sector programs that affect agriculture; new linkages between public and private R&D; and alternative ways to manage, evaluate, and fund agricultural research.

Want to know more?

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Edited and designed by Sara Delheimer



NC-1034 scientists have contributed research about the social and economic impacts of biotechnology. One study found that consumers would be willing to pay 14% less for food labeled as genetically modified (GM), suggesting that voluntarily labeling will be unappealing to the U.S. food industry. Studies have not shown that mandatory labeling would improve social welfare.